Sovremennye Problemy Distantsionnogo Zondirovaniya Zemli iz Kosmosa 2017 vol.14 N2, pages 98-109

Geomorphometric analysis of river basins of the Volga Federal District using SRTM and Aster GDEM data

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Abstract

A spatial database of geomorphometric parameters of 1:200 000 scale based on river basin approach has been created for the Volga Federal District for the first time. Watersheds created with semi-automated method of terrain and hydrological modeling in TAS GIS and WhiteBox GIS were used as spatial units. DEMs SRTM and Aster GDEM and hydrographic network vectorized from topographic maps were used as input data. Basic morphometric characteristics of relief such as mean height, slope, slope length, height range, river network density and factor LS were calculated for each watershed using the above-mentioned DEM. From zonal statistics for river basins, the average values of these characteristics were obtained. Spatial analysis and interpretation of morphometric characteristics of relief based on existing scales and classifications was carried out. The accuracy of the results was assessed by comparing with characteristics calculated by 100m-resolution DEM based on topographic map of scale 1:50000. Small average errors obtained prove reliability of the results.

http://dx.doi.org/10.21046/2070-7401-2017-14-2-98-109

Keywords

ASTER GDEM, Relief morphometry, SRTM, Volga Federal District

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